UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/697,133	10/30/2003	Harald Philipp	PST	9746

20191 7590 08/23/2005

DAVID KIEWIT
5901 THIRD ST SOUTH
ST PETERSBURG, FL 33705

EXAMINER	
NATALINI, JEFF WILLIAM	
ART UNIT	**PAPER NUMBER**
2858	

DATE MAILED: 08/23/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/697,133	PHILIPP, HARALD	
	Examiner	Art Unit	
	Jeff Natalini	2858	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *07 June 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-28* is/are pending in the application.

4a) Of the above claim(s) *24-28* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-14,16-19 and 21-23* is/are rejected.

7)☒ Claim(s) *15 and 20* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *30 October 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *10/30/03*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

Election/Restrictions

1. In regard to the arguments made and because of the amendments submitted on the restricted claims, it is agreed independent claims 1, 13, and 18 now can be considered one group and the restriction will be removed and the claims examined accordingly. The method claims however still represent a patentably distinct invention:

I. Claims 1-23, drawn to a capacitive sensor, classified in class 324, subclass 662.

II. Claims 24-28, drawn to a method of measuring position along a sensing body, classified in class 324, subclass 679.

Inventions I and II are related as process and apparatus for its practice. The inventions are distinct if it can be shown that either: (1) the process as claimed can be practiced by another materially different apparatus or by hand, or (2) the apparatus as claimed can be used to practice another and materially different process. (MPEP § 806.05(e)). In this case the process as claimed will be practiced with an apparatus with resetting means to reset all the sample capacitors to an initial state after a determination is made, and a clock or counter means in order to wait a selected interval before opening or closing the switches.

Accordingly claims 1-23 will be examined as they are now drawn to the elected invention.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 1-3, 7, 9, and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Philipp (6288707) in view of Shahoian et al. (6304091).

In regard to claims 1, 7, and 12, Philipp discloses a capacitive sensor for providing an output representative of a position along a sensing body extending between two electrodes at which an object is proximate the sensing body (abstract-multi-electrode would include two or more), the sensor comprising: two capacitive sensing channels with each channel connected to a respective one of the electrodes (fig 3 (electrode 36 connected with X1 and Y1, and seen in fig 10 as channels), each channel having a respective channel output representative capacitive load imposed by the object when the object is proximate the body (abstract first two sentences, and fig 10 where it is seen the capacitor outputs are fed to the microcomputer to determine position of object); means for operating the two channels synchronously (col 11 line 14-24), and calculation means for receiving the respective outputs from the two channels by calculating a ratio of a selected linear combination of the outputs of the two channels, the ratio varying linearly (it would be linearly because it explains any nonlinearities would be corrected with a software program (col 8 line 1-15)- (this also relates to claim 12)) with the position of the object, and for supplying the ratio as the output

representative of the position (col 8 line 25-40 and col 3 line 25-39 (notes that two electrodes are used in a one dimensional analysis, though using four electrodes would still read on the claim as it does contain two electrodes and two are taken into account in the ratio)), wherein each channel has a sampling capacitor (fig 10 (capacitors in each channel)).

Philipp lacks wherein each channel has a respective output representation of a respective non-linear response to a capacitive load imposed by the object when the object is proximate the body, so that the capacitor has a voltage rise in inverse exponential fashion.

Shahoian et al. teaches where each channel (fig 3a, V1 and V2 make up the two channels) has a respective output representation of a respective non-linear response (fig 3b shows the non linear outputs) to a capacitive load imposed by the object when the object is proximate the body (abstract), so that the capacitor has a voltage rise in inverse exponential fashion (fig 3b, V1 is a inverse exponential fashion), then a calculation is used to determine a ratio of a linear combination of the two channels (col 7 line 60 – col 8 line 5 seen in the linear combination part of fig 3b, and also in fig 5b), the ratio varying linearly with the position of the object (col 2 line 6-21).

It would have been obvious to one with ordinary skill in the art at the time the invention was made for Philipp to incorporate having the output representation of the capacitive load be non-linear and then calculate a ratio of selected linear combinations, so the output varies linearly as taught by Shahoian et al. in order to eliminate second order polynomial terms from the output (col 8 line 3-5).

In regard to claim 2, Philipp lacks specifically stating wherein the respective output from each of the channels comprises an algebraic difference between a respective first value measured when the object is adjacent the sensing body and a respective second value measured when the object is distal therefrom.

Allen et al. teaches wherein the respective output from each of the channels comprises an algebraic difference between a respective first value measured when the object is adjacent the sensing body and a respective second value measured when the object is distal therefrom (abstract, states capacitance changes when the object is further and to it is very close, thus a difference exists).

It would have been obvious to one with ordinary skill in the art at the time the invention was made for Philipp to have a algebraic difference when the object is adjacent the sensor to when the object is far from the sensor as taught by Allen et al. in order to develop electrical signals representative of the centroid of the profile of the object.

In regard to claim 3, Philipp discloses wherein the object is capacitively coupled to an electrical ground (is the finger of a person (abstract) as is stated in the present invention).

In regard to claim 9, Philipp discloses wherein the sensing body comprises two strips of conductive material extending adjacent to each other with a cap there between, wherein at least one of the strips tapers along its length (see figs 4,5,6; col 10 line 34-46).

4. Claims 4, 5, 8, 13, 14, 18, 19, and 21, are rejected under 35 U.S.C. 103(a) as being unpatentable over Philipp (6288707) in view of Shahoian et al. (6304091) as applied to claim 1 above, and further in view of Philipp (6466036- herein to be referred to as Philipp 2).

In regard to claims 4 and 13, Philipp discloses all that is disclosed in claim 1, and wherein each channel discloses a sample capacitor (fig 10 capacitors on each channel) having two terminals on of which is connected to associated electrode (X1 and X2 connect to electrodes (36) from fig 3), two electric switches (fig 10 (56 and 90)) each of the switches having both a single respective closed state for connecting one of the terminals of the respective sample capacitor to one of two different reference voltages (56 to Vref and 90 to ground), each of them having an open state where it does not connect one of the terminals to either of the two reference voltages, with a means for controlling the switching (fig 10 (57,63)); and a respective measurement circuit for supplying the channel output to a voltage measurement at a selected on of the terminals of the respective sample capacitor (fig 10 (82, 84, and 86 then to microcomputer); col 12 line 41-45).

Philipp as modified lacks wherein the capacitor is connected to the electrode by means not comprising an electric switching element and a third switching element with the same functionality of one of the two switching elements disclosed.

Philipp 2 teaches connecting a capacitor to a sensing plate specifically without using an electric switching element (col 14 line 26-29).

It would have been obvious to one with ordinary skill in the art at the time the invention was made for Philipp to incorporate the teaching of not connecting the capacitor to the sensing plate, which electrodes are coupled to (fig 3), by means of a switch as taught by Philipp 2 in order to allow continuous discharge of the capacitor to have continuous position measurement.

MPEP 2144.04 VI B states that mere duplication of parts has no patentable significance unless a new and unexpected result is produced. In re Harza, 274 F.2d 669, 124 USPQ 378 (CCPA 1960).

It would have been obvious to one with ordinary skill in the art at the time the invention was made to add an extra switch to either connect a terminal of the sensing resistor to either Vcc or ground as stated in MPEP 2144.04 VI B in order to have a backup incase one switch failed to connect the terminal to a reference voltage.

In regard to claims 5 and 18, Philipp discloses all that is disclosed in claim 1, and a plurality of electric switching elements (fig 10 (56, 62, and 90)), a sample capacitor (fig 10 capacitors on each channel) having two terminals on of which is connected to associated electrode (X1 and X2 connect to electrodes (36) from fig 3), at least one respective electric switching element of the plurality thereof for resetting the respective sample capacitor by connecting both of its terminals to a first selected reference voltage (fig 10 (90 connects both of capacitors terminals to ground)), and two switches for applying a reference voltage to one of the terminals (56 Vref and 90 to ground); with a means for controlling the switching (fig 10 (57,63)).

Philipp as modified lacks wherein the capacitor is connected to the electrode by means not comprising an electric switching element and a where the second terminal of the capacitor contains a switch to provide a second reference voltage.

Philipp 2 teaches connecting a capacitor to a sensing plate specifically without using an electric switching element (col 14 line 26-29) and wherein two switching elements are connected to alternately switch one reference voltage to one terminal with one switch (fig 7 (S1)) and the other switch provide a second selected voltage to the opposite terminal (fig 7 (S2); col 6 line 45-65).

It would have been obvious to one with ordinary skill in the art at the time the invention was made for Philipp to incorporate the teaching of not connecting the capacitor to the sensing plate, which electrodes are coupled to (fig 3), by means of a switch as taught by Philipp 2 in order to allow continuous discharge of the capacitor to have continuous position measurement and to incorporate having two different reference voltages being connected by two switches to opposite terminals on the capacitor as taught by Philipp 2 in order to so that a floating switch which can be expensive is not required to perform the sensing capabilities (col 59-61).

In regard to claims 8, 14, and 19, Philipp lacks specifically stating a calculation means comprises a microcontroller and wherein the microcontroller controls a plurality of switching elements.

Philipp 2 discloses a calculation means comprises a microcontroller (flowchart in fig 16 (specifically numbers 4 and 5) shows processes of the microcontroller and it

measures and analyzes data; col 11 line 15-19) and wherein the microcontroller controls a plurality of switching elements (col 8 line 47-59).

It would have been obvious to one with ordinary skill in the art at the time the invention was made for Philipp to have a microcontroller for calculations and to control switching elements as taught by Philipp 2 in order to create sub microsecond switching times (col 8 line 54-55).

In regard to claim 21, Philipp discloses wherein the sensing body comprises two strips of conductive material extending adjacent to each other with a cap there between, wherein at least one of the strips tapers along its length (see figs 4,5,6; col 10 line 34-46).

5. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Philipp (6288707) in view of Shahoian et al. (6304091) as applied to claim 1 above, and further in view of Haase (20020140440).

Philipp discloses each channel having means for measuring a parameter change at the associated electrode (abstract, col 12 line 42-45; whenever object moves the electrode causes the charge through the capacitors to be changed and determined), means for operating the two channels synchronously comprises a controller for controlling at least three electric switching elements (fig 10 control lines (57, 63, 90) to control the respective switches are inherently coming from a controller), two of the at least three electric switching elements are operable by the controller to simultaneously connect both of the two electrodes to a first reference voltage (two switches on the far

right X1 and X2 are connected to electrodes (36) from fig 3 and are connected to Vref), at least a third of the at least three switching elements is operable to simultaneously connect a second reference voltage to the capacitor (control line 90 will control the two bottom right switches to accomplish this task, as this will read on the claim as third and fourth (corresponding to at least a third) switches are able to accomplish this feature of simultaneously turning the switches on or off with the control line).

Philipp as modified lacks wherein each channel contains a resistor-capacitor pair.

Haase discloses a system for sensing capacitance that includes a resistor-capacitor pair (one embodiment- fig 8, has resistor (806) capacitor (802) and electrode (812)).

It would have been obvious to one with ordinary skill in the art at the time the invention was made for Philipp as modified to have a resistor-capacitor pair instead of just a capacitor as taught by Haase in order to accurately determine the value of the mutual capacitance and the value of the measured variable.

6. Claims 10, 16, and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Philipp (6288707), Shahoian et al. (6304091), and Philipp 2 as applied to claim 1, 13, and 18 above, and further in view of Brandt (6559658).

Philipp as modified lacks wherein the sensing body comprises a single resistor.

Brandt discloses wherein the sensing body comprises a single resistor (col 4 line 37-40; fig 3 (42)).

It would have been obvious to one with ordinary skill in the art at the time the invention was made for Philipp as modified to have a sensing body comprising a single resistor as taught by Brandt in order to have the sensor output provide a modified composite waveform (col 4 line 41).

7. Claims 11, 17, and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Philipp (6288707), Shahoian et al. (6304091), and Philipp 2 as applied to claim 1, 13, and 18 above, and further in view of Bloom et al. (4622437).

Philipp as modified lacks wherein the sensing body comprises a plurality of discrete resistors connected in series.

Bloom et al. discloses wherein the sensing body comprises a plurality of discrete resistors connected in series (fig 4 resistors 420b, 420c, 414c, 414d; is very similar to pictures applicant has submitted and explained in figs 6a and 6b).

It would have been obvious to one with ordinary skill in the art at the time the invention was made for Philipp as modified to have a sensing body comprising a plurality of discrete resistors connected in series as taught by Bloom et al. in order to provide an improved linear mapping of the measured impedance ratios to coordinate positions close to the electrode network (col 10 line 1-6).

Response to Arguments

8. Applicant's arguments with respect to claims 1-13 have been considered but are moot in view of the new ground(s) of rejection.

Allowable Subject Matter

9. Claims 15 and 20 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The prior art lacks means for summing the respective outputs from the two measurement circuits and for providing a detection output if the sum exceeds a selected minimum threshold value in the combination as claimed.

Conclusion

10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Reid (4581714) discloses a method for linearizing the output of an instrument that includes a transducer having an output that is a nonlinear function. Elliot et al. (US Publication 20050145030-not prior art but pertinent subject matter) discloses a capacitor having a capacitance that varies non-linearly in response to measured input and circuitry that derives from the capacitance a signal that varies substantially linearly.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jeff Natalini whose telephone number is 571-272-2266. The examiner can normally be reached on M-F 8-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eddie Lefkowitz can be reached on 571-272-2180. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Jeff Natalini

ANJAN DEB
PRIMARY EXAMINER